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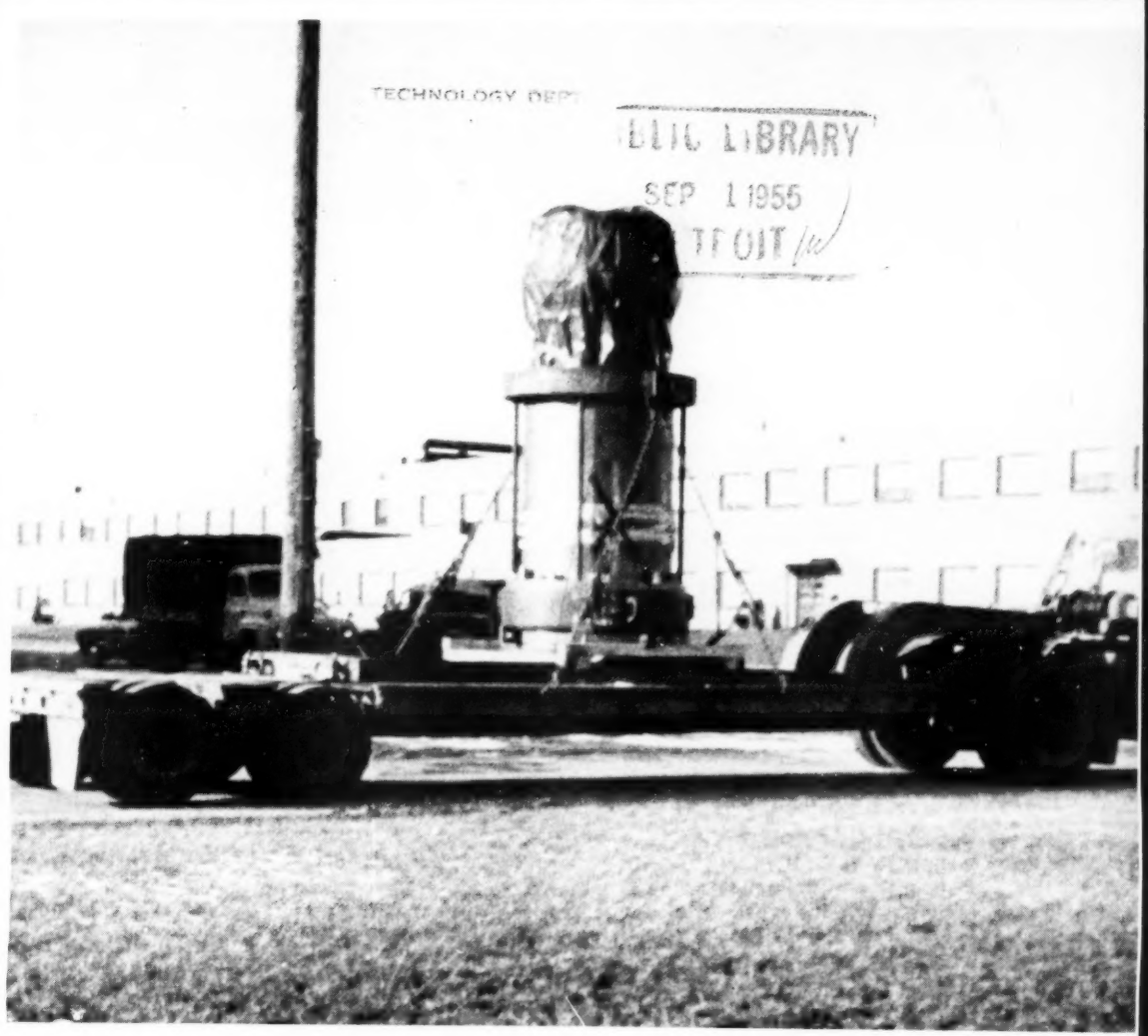

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SAFETY STANDARD DEVELOPED — PAGE THREE

Vol. 8 AUGUST, 1955 No. 3

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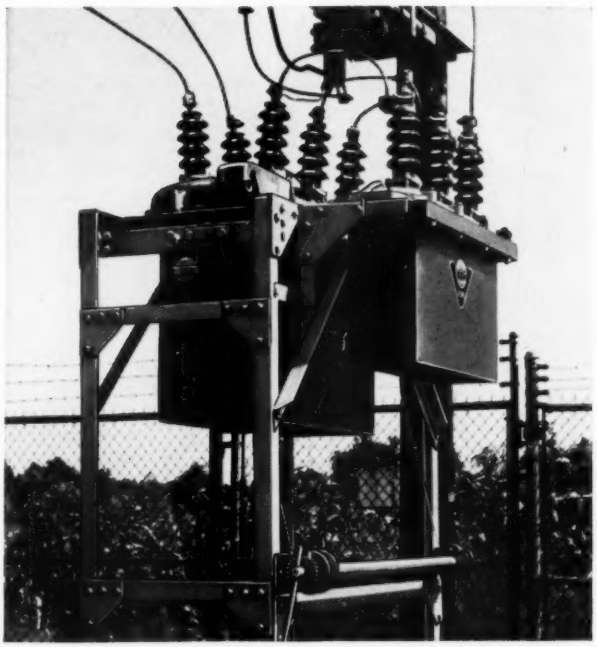

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Serving the Engineering Profession

AUGUST, 1955 — Vol. 8, No. 3

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COVER STORY

On this issue's cover you see the reactor core, which contains the atomic fuel, for the land-based prototype of the world's first atomic submarine. Built under contract and supervision of the Atomic Energy Commission, the core traveled 2200 miles to the National Reactor Testing Station in Idaho where it was installed in the full-scale model of the power plant now in use in the U.S.S. "Nautilus." This picture was recently declassified.

—Westinghouse Photo

Announcing a New Service For Members of the Western Society of Engineers

For the past several years there has been a number of requests for a billing service on food and beverages to our members.

Since so many of our members have expense accounts or operate their our businesses, they would prefer to have a record of these expenses such as would be provided by a monthly statement backed up by house checks.

Your Board of Direction has, therefore, authorized a new service which will be known as a gold card membership beginning September 1, 1955. Members holding this card will be authorized to sign for food and beverages which will be billed at the end of each calendar month.

There will be no added dues or charges for this service except that a gold card member will be expected to maintain a minimum monthly bill of $10.00. Since there will be added bookkeeping expense in handling these house accounts, this minimum billing requirement is essential.

It is also our hope that the plan will produce a greater and more uniform use of our very fine food and beverage services. We want and expect our gold card members to use up the minimum every month.

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A. P. Boyard

President

For Printing Press Controls & Signaling Devices,

Safety Standard Developed

By Lillian Stemp, MWSE

Standardization of certain features of electrical controls and signaling devices for graphic arts presses has been incorporated in the new American Standards Association Safety Code for Controls and Signaling Devices, B65.1-1954. Copies of the Code were made available early this year. Several suppliers have already modified their electrical control equipment to comply with the Code.

Compliance with the Code will go a long way towards eliminating confusion existing at some of the present controls. Accordingly, there should be less chance for personal injury from this source, and there should be greater opportunity to improve efficiency of operation.

Confusion at controls as a problem was identified both collectively and individually. Individually the problem was identified by a number of printing firms who tackled it either solely from the desire to improve press production, or strictly from a safety standpoint. Both approaches, of course, lead to greater safety for the personnel.

Collectively it was about seven years ago when the presswork committee of the Research and Engineering Council of the Graphic Arts Industry, Inc., of Washington, D. C., recognized the problem as an interruption to press production. And, in 1951, the Printing and Publishing Section of the National Safety Council outlined the problem as one contributing to personal injury. One of the things that gave impetus to action on the problem on a national basis was supporting evidence in the form of case histories of injuries related to confusion at controls and the lack of signaling devices.

For example, in Bulletin No.: 1139, issued by the U. S. Department of Labor on *Injuries and Accident Causes in the Manufacture of Paperboard Containers, 1950,* the following was reported: "In some instances the consequences of a person's thoughtless action fall upon another person. A particularly hazardous practice in the latter group is that of starting machines without first making sure that all other workers have been warned and are in the clear. Accidents chargeable to this fault occurred frequently enough to indicate that this variety of unsafe act is rather widespread in the industry." The publication then lists some case histories. Here is one that was a fatality: "A laborer crawled under a printing press to clean. When the operator started the press, the traveling bed crushed the cleaner. Investigation disclosed that the operator had not been informed of the cleaner's presence."

The new Safety Code provides against recurrence of such an accident through its section on Signals which reads as follows: 4.3 Warning Signals on Commercial Presses. Commercial presses attended by more than one person, where it is possible for one of the employees to enter the frame or be obscured from view, shall be equipped with visual or audible signals, or both. Where this condition exists, control circuits shall be so arranged that signals must be operated immediately prior to any movement of the press."

The two interested groups, the Printing and Publishing Section of the National Safety Council, and the Research and Engineering Council of the Graphic Arts Industry, agreed to sponsor the project of developing the safety code. A sectional committee was formed in accordance with ASA procedure. The chairman of the group, Peter J. Bernard, of the H. Wolff Book Manufacturing Co., New York City, represented both

Miss Stemp, the author of this article, is a safety engineer, and an industrial and technical writer.

Figure 1: A small portion of the Sectional Committee which helped develop the American Standard Safety Code for Controls and Signaling Devices for Graphic Arts Presses, B65.1-1954. Miss Stemp, the writer of this article, is shown as a member of this committee. She is shown as the fourth person from the left.

organizations and also served in behalf of the Book Manufacturers' Institute. Other personnel of the committee represented all segments of the graphic arts industry as well as related groups. For example, there were men from the International Association of Electrical Inspectors, ASME, NEMA, National Electrical Contractors Association, National Printing Equipment Association, Inc., National Association of Mutual Casualty Companies among others. See figure 1.

One of the items that helped the committee greatly during its meetings was the exhibit of various control stations in existence. Representatives from Cline Electric, Cutler-Hammer, Condé Nast Press, General Electric and Harris-Seybold provided the display boards.

The educational aspect and value of the exhibit prompted the group to promote the idea of using a similar arrangement to educate users to the contents of the Code after it was approved by the American Standards Association.

The Code, it should be noted here, refers to publication presses as well as commercial presses. Publication presses are defined as those which "are large web-fed presses such as are used for newspaper, magazine, rotogravure, large catalog work, etc. Such presses are generally equipped with unit drives, two-motor drives, or group drives."

Commercial presses are defined as the "sheet-fed presses and small web-fed presses. They are generally equipped with single-motor drives."

In the study of accidents related to controls at presses, it was determined that many of these occurred when the wrong button was pressed. For example, a pressroom in Wisconsin had trouble with smashing plates and blankets on their offset presses when employees pressed run buttons instead of inch buttons. In another company an operator was changing a packing on a cylinder. He reversed the press through error and caught his left hand between the cylinders.

To eliminate similar possibilities, the Safety Code provides for distinctive protective measures on commercial presses. For example, for quick access to the stop button, the long push button is recommended, with the stipulation that it protrude beyond the enclosure by a distance of not less than $\frac{3}{8}$ in. greater than other push buttons.

So as not to hit the run button accidentally, the Safety Code recommends that "the RUN button shall be equipped with a sleeve guard extending not less than $\frac{1}{2}$ in. beyond the surface of the button. The guard on the RUN button may be omitted if a combination "INCH-RUN" system of push-button control is used, where inching operation is obtained by pressing the INCH button alone, and running operation is obtained by pressing the INCH and RUN buttons simultaneously."

The "one finger inch, two finger run" development was worked out by James J. Cochran of the Seybold (Dayton) Division of Harris-Seybold Co., and John R. Adriansen of Cutler-Hammer, Inc. Because the safety control can be used on machines other than the printing presses

(Continued on Page 14)

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In City Work:

The Young Engineer

Dick Van Gorp, MWSE

Paraphrasing a famous humorist of the early part of this century, "a young engineer in city work is a *good* thing."

It is *good* for the city and *good* for the engineer going out on his first job, be it in an office with a slide rule, or out in the field with a transit.

The city will profit by his fresh insight, enthusiasm and the forward-looking approach; the engineer will profit from his contact with an alluring variety of large city projects and capital improvements on which he will be called to apply his knowledge and skill and which, as time goes on, will challenge his foresight.

The necessity for appealing to young engineers not to skirt city employment fields arises from the fact that there is a shortage of skilled technical men. The battle during the past few years between private organizations and public bodies for the engineering graduates has grown exceedingly sharp, with the result that the city is practically in a position of having to take "what is left" after the private groups and industry have taken the cream by sitting on the doorsteps of engineering halls at commencement time and pushing contracts for jobs into the pockets of the graduates while they are still wearing their caps and gowns. The city is not always in a position to do this. It is a matter in which we are limited though we attempt to do some recruiting in the five or six major engineering schools in Chicagoland. We have had some success, though at times discouraging. A serious problem all employers face is limited tenure of young engineers facing federal call in the armed services.

The diversity of opportunity in city work should be especially appealing to the young engineer. Practically all major branches of engineering are represented on the payrolls of a city like Chicago.

There are demands for civil engineers, mechanical, electrical, sanitary, chemical, architectural, etc. Since the large city caters to the needs of its citizens, its governmental functions reach into many fields; it governs traffic and as a result requires traffic engineers; it builds highways, bridges, parking facilities, water works, sewers, fire stations, etc., and accordingly requires a variety of engineers for their design, construction and operation; it operates water works and filtration plants and for that requires sanitary and chemical engineers; it has a health department, where again the services of chemical engineers and sanitation experts are required.

This brings me to that question so frequently asked:

Why is it so difficult for a great municipality like Chicago to attract young engineers to its payrolls?

The variety of experience that one may desire is certainly not lacking. And the rates of pay are practically on a par when compared with those in other governmental bodies and in private organizations.

However, it should be pointed out that municipal and governmental employments have over a long period of years merited salaries not at the level of engineers in private firms and in industrial employ. Over the last several years this differential has largely been overcome in the Chicago Municipal Service. This has been accomplished through the fine cooperation of the administrative and executive branches of city government. Today our salaries compare favorably with those paid in private employment and in other governmental agencies.

In addition to the comparable rates of pay with private organizations, the city worker also enjoys a reasonable pension plan, including widow and orphan benefits, a work week comparable to other employment, 2-week vacations with pay and sick leave with pay.

Returning for a moment to the matter of diversification of opportunity for the engineer in the city employ, let's look briefly to Chicago's engineering organization. In 1953, a consolidation of all capital improvement engineering activity was consumated.

The Bureau of Engineering of the Department of Public Works was formed into which the following activities were consolidated:

1. The Department of Subways and Superhighways was completely absorbed as the Division of Subways (local transportation) and Superhighways.

2. Certain divisions of the former Department of Public Works were put in the new Bureau, including:

1. The Filtration Design Division
2. The Sewer Planning Division
3. The Sewer Construction Division
4. The Division of Bridges and Viaducts
5. The Water Distribution Design Division
6. The Water Works Construction Division

7. Certain planning of new street rebuilding and widening were included in the Superhighway Division as well as traffic channelization. Major street grade separations were added to the operations of the Bridge and Viaduct Division.

In years of interviewing young engineers, it has appeared that continuing tenure of employ seemed to be a matter of great importance to new employees. This leads to a brief resume of our public works program in this discussion.

Chicago, through its Engineering Board of Review has for a number of years, programmed and kept up to date an anticipated improvement schedule for a period at least five years in ad-

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Mr. Van Gorp, chief engineer, Bureau of Engineering, Chicago Department of Public Works, presented this talk before the Civics Committee of the Western Society of Engineers in Chicago.

Figure 1. Contract value of public work for the City of Chicago in 1954.

Superhighways	$ 9,880,000
City Streets	1,338,000
Subways (Local Transportation)	3,350,000
Parking Structures	9,540,000
Wrecking	527,000
Bridges and Viaducts	8,453,000
Sewers	15,835,000
Construction Division (Water Works)	13,780,000
Force Account Work (Construction Division)	1,970,000
Other Accounts (Construction Division)	331,900
	$65,004,900

vance of such needs. Under one state law we are required to program Motor Fuel Tax financed Street and Highway Programs for 1 year and 5 year periods since 1951. This same practice has been followed for other capital improvements.

Our five year program for the period 1954-1958 is a matter of record in report B.R. 167 of the Engineering Board of Review dated March, 1954. This program details such needed facilities as Highways, including lighting, Local Transportation Subways, Airports, Parks, Water Works, Sewers and Service Buildings and equipment totaling expenditures estimated at $447,492,000.

A continuation of such public works to meet the needs of the second city in the United States can only mean continued employment in an orderly fashion for engineers.

During 1954 the accumulated total contract value of public works designed and placed under contract by the Bureau of Engineering totaled $65,004,900, (comprising, as shown in Figure 1).

After removing contracts completed before December 31, 1954, the total of contract obligations in various stages of completion remained at a grand total of $44,500,000.

So, there is no need for the young engineer to feel insecure in the regard of capital works needed. Our cities and their satellite communities can only survive if they supply needed public works.

A talk was recently made at the annual meeting of the American Society of Mechanical Engineers in New York City by Senator Thomas Desmond of New York State, in which he made the point that government would benefit by having more engineers in legislative assemblies and fewer lawyers.

I concur in that and for the same reason as that advanced by the Senator, which was that lawyers are trained to look forward. Stressing the point he said, and I quote, "A good engineer is constantly on the alert for new methods to solve new problems; therefore, the engineering type of mind is so much needed in solving current problems that engineers must not shirk their civic duties."

This is the modern concept of the place in society, be it technical, social or political, for the engineer of today and the future, and was echoed recently by Alfred P. Sloan, Jr., Chairman of the Board of General Motors Corporation, when he said:

"There are substantial reasons why the engineer should play a large part in the direction of our society. In the first place, we need the engineering point of view. In the organization and direction of large-scale enterprises, economic or social, we need the *respect* which the engineer *has* for basic facts. We need his analytical frame of mind. We need his imagination. We need his contact with interpretation and control of physical forces. His is the type of discipline that is sure to contribute a maximum degree of order and sense in our complicated economy, and promote the best and most efficient use of our natural resources, both human and material.

"It is logical that the engineer, in exercising his expanded responsibility, should recognize, as indeed he has, that there is more in business than business itself. Thus it is that he has developed

(Continued on Page 16)

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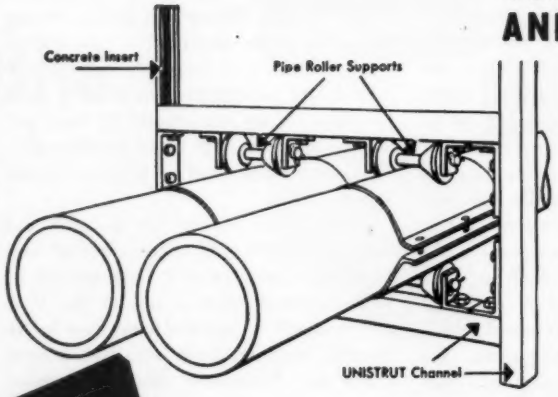

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'Run Away' Reactor Is Described

Details of the construction and operation of a nuclear reactor which was made to "run away" in more than two hundred important safety experiments were just described by Dr. Joseph R. Dietrich of Argonne National Laboratory at the United Nations' International Conference on Peaceful Uses of Atomic Energy. The Conference was held in Geneva, Switzerland, from Aug. 8 to 20.

The experimental reactor, known as Borax I, was constructed in 1953 by Argonne scientists and engineers at the Atomic Energy Commission's National Reactor Testing Station in Idaho under the direction of Dr. Walter H. Zinn, laboratory director. The tests, conducted during a two-year period, have shown that a properly designed water-cooled and moderated nuclear reactor, if allowed to get out of control, will automatically shut itself down before excessively high temperatures would cause destruction of the reactor. The series of tests is regarded as being of great importance to the future development of reactors for the production of electrical power.

The reactor consisted of a core assembly of plates made of enriched uranium and aluminum immersed in water inside a steel tank or reactor vessel. The reactor vessel stood inside a larger, open tank, which was partially buried in the ground. Earth was piled around the protruding section of the tank for shielding. The reactor was operated, remotely, from a control station located one-half mile away.

The experiments simulated hypothetical reactor accidents in which the control rods, which normally hold the reactor power to a safe level, suddenly lose control and allow the power to increase at a rapid rate. The method used was briefly as follows: The reactor was provided with five neutron-absorbing control rods, one of which could be ejected rapidly downward out of the reactor core under the influence of strong springs and gravity. The reactor was made critical (operating) at a very low power with this rod inserted to some pre-chosen position in the reactor, and with the remaining control rods (known as shim rods) more or less fully withdrawn from the core. The main rod was suddenly ejected and the reactor power was allowed to rise exponentially. Eventually, the reactor would produce sufficient steam to check the rise of power, and, in fact, to reduce the power to a low level. At some pre-chosen time thereafter (1 to 20 seconds) the shim rods were actuated by an electric timer to drop into the core and terminate the experiment.

Motion picture records of the experiments or excursions show the following events occurring: An instant after the center rod had been dropped, the inside of the tank was illuminated by a flash of light which originated in ionization and Cherenkov radiation as the reactor power reached a high value. Heat, liberated by the fissioning of uranium atoms, caused steam to form around the fuel plates and the resultant absence of neutron moderating water immediately reduced the reactor power to a low point. Shortly after the light flash—after the reactor power had been reduced by steam formation—the water surface was agitated by the motion of the water being expelled from the reactor core by the steam.

The effectiveness of steam formation as a safety mechanism depends, of course, on the speed with which steam can be formed. In the earlier experiments, the reactor power increased by a factor of ten in about five hundredths of a second (0.05 sec.). By proper adjustment of the number of fuel elements in the reactor core and of the positions of the four shim rods, the rate at which the power increases could be made much more rapid.

Further experiments were conducted in which the power was increased tenfold in slightly more than one hundredth of a second. These experiments were mechanically more violent than the earlier ones, and caused the expulsion of steam and water from the reactor tank. Water was thrown out of the tank to a height of about thirty feet, and the pressure in the reactor core arising from the rapid acceleration of water was sufficiently high to deform the fuel plates.

Despite this mechanical damage the maximum temperatures reached by the fuel plates (about 640°F) did not approach the melting temperature. It was decided that the reactor, which by this time had fulfilled its other purposes, should be sacrificed in an experiment which would be violent enough to melt the fuel plates. Extension of the experiments to create such a condition was considered important even though there is an almost negligible probability of this happening to an operating reactor.

This experiment was conducted on July 22, 1954. The ejection of the rod required only about 0.2 seconds and the

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rod was about 80 per cent out of the core when the reactor power reached its peak value. In a very short time after the release of the central control rod a column of dark grey smoke was ejected from the reactor to a height of some eighty feet. Shortly thereafter, the sound of a medium sharp detonation reached the control trailer. In a few seconds the smoke cleared away, and it was apparent that the entire superstructure of the reactor, containing the control rod mechanism, had been carried away. The maximum power achieved was in excess of ten million kilowatts.

The results of the experiment were as expected. Most of the fuel plates had been melted. The pressure resulting from the molten metal in contact with water had burst the open reactor tank, carried away the control rod mechanism, and ejected the remains of the reactor core high into the air. Most of the fuel element fragments fell to earth within a radius of two hundred feet around the reactor, and there was no appreciable radioactive fall-out at distances greater than a few hundred feet.

Although the reactor was destroyed, the explosion was a relatively mild one, comparable to that which could be produced by a few pounds of TNT. The catastrophic release of energy characteristic of "nuclear devices" was prevented by the inherently safe characteristics of the reactor, even though the planned "accident" was much more severe than any that might occur in operation. Results of these studies are believed to point the way toward more economical power reactors through minimization of the hazard problem, simplification of reactor design, and reduction of the temperature demands on reactor materials.

Wanted: Better Traffic Jams

More and better traffic jams may be the answer to some states' budgetary problems, *National Petroleum News* notes. One observer's reasoning: Traffic congestion in New York City costs motorists $25 million annually in wasted gasoline, meaning more than $3 million in added gasoline taxes for the state. The day is coming, he claims, when the state can finance all activities from traffic jams.

To Demonstrate Power Designs

New trends in design will be extensively demonstrated at the Chicago Exposition of Power and Mechanical Engineering, to be held in the Chicago Coliseum Nov. 14 to 18. The exposition will be held under the auspices of the American Society of Mechanical Engineers in conjunction with its Diamond Jubilee Annual Meeting, climaxing the year-long celebration of the society's 75th year. The Coliseum, near hotels where the meetings will be held, affords excellent display facilities and is easily accessible for frequent visits by members and guests.

Most remarkable among trends to be revealed at the exposition will be those based on advanced materials and their uses: more resistant alloys have been developed in ferrous and nonferrous metals; more versatile non-metallic materials have appeared, notably in plastics and ceramics; there have been many advanced applications in the important fields of sandwich materials and coatings. Much of the advancement in materials will be disclosed through exhibits of equipment incorporating improved methods of fabrication, such as are required to accommodate the tougher properties of the new materials. The effect of these innovations has been to permit many designs to be reorganized basically in terms of higher physical specifications.

The Atomic Power Section will be a new feature at the exposition. It has been organized to demonstrate phases of the application of atomic energy to power that are of special interest to mechanical engineers, and in support of the program of technical papers to be offered at the A.S.M.E. meeting. The atomic energy section of the meeting program will be contributed by the Nuclear Engineering Division, recently organized by the Society.

Nucleonics engineering has already created many new problems, from the shielding of reactor plants and radioactive materials in transit and in use, to many novel functions, such as reactor operation, disposal of radio-active wastes, and even the machining of "hot" materials—all of which must be observed through electronic eyes and manipulated by prosthetic instruments.

One exhibitor in the Atomic Power Section will offer an engineering consultation service to manufacturers planning to adapt equipment to nuclear applications. Another will present a resumé indicating the hard core of the fast-spreading atomic engineering industry. This will show that of about one hundred of the most active, non-specu-

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lative organizations now operating, more than 40 are engaged in mining, while the remainder are about equally divided between the processing of materials; the development of reactor components and supplementary equipment; and applications of atomic power under Atomic Energy Commission projects — submarine, surface and supersurface—or else are associated in the development work of the four great nuclear power utility plants that are already in progress somewhere between blueprinting and construction.

A number of exhibitors in other sections of the exposition are also active in the fields of atomic power and radioactive materials applications in manufacturing and in medicine. Several are in the direct line of A.E.C. projects; others in the adaptation of conventional engineering equipment to the needs of atomic power plants in the way of heat exchange and the storage and transfer of isolated liquids and gases.

Among exhibitors of mechanical engineering equipment to which space in the Coliseum has been allotted are the manufacturer of an extensive line of packaged boilers and another whose specialty is a quick-firing boiler of a type favored in plants where there is an intermittent demand for high-pressure steam. A third exhibitor has an enviable record in equipping plants for the control of fly ash. A fourth specializes in boiler settings. Space was also allotted recently to the exhibitor of a revolutionary new drafting desk.

Products on view will further include mechanical packing and seals, expansion joints and molded rubber products in one instance; adjustable pipe hangers and supports in another; a unique method of insulation and corrosion protection for underground piping, in a third. Underground and overhead prefabricating piping, for steam and for hot water, also for various liquids will be seen, as will a newly engineered system of cable and tubing raceways.

New design and new materials will be found in a line of steam traps in semi-steel, cast steel and forged carbon moly. They have high maximum capacity, but operate on low condensate loads.

Power transmission equipment will be represented by clutches, couplings, hangers, pillow blocks, speed reducers, speed increasers, variable speed transmissions—variety offered in each class. Motors that solve many critical drive problems will account for variety in that classification. In one instance unusual types of alternating current motors will be shown in action; the English manufacturer originating them is said to be the world's largest ac motor producer.

There will be displays of motor maintenance equipment — commutator and armature testing and repair appliances in one instance, mechanical and electro thermal carbons for bearings, seals and special applications, in another.

Among exhibits of massive equipment will be a car shakeout, such as is used for unloading ore, coal, gravel, sand, grain, chemicals and other bulk materials. The manufacturer of this equipment has also developed and will show for the first time an electronic level indicating instrument. Housed in a rugged steel probe is a small radio transmitter. The probe is set at the predetermined leveling point, and when material being measured flows to that level, change of pressure on the probe distorts the signal that is being transmitted to the control unit. At that point a warning signal may be set off, or telemotored controls put in motion.

Jobs Created by American Business

American business has created close to nine million new jobs since World War II, neatly keeping pace with the demand, according to the Chamber of Commerce of the United States in Washington, D. C.

That, says the Chamber, should throw just about the last spadeful of earth over the grave of the notion that improved technology causes unemployment.

The nine million new postwar jobs cover all industries except agriculture. Government jobs also are excluded. During the same period, the Chamber reports, the number of persons of working age also increased by about nine million.

These events took place during an era of expanded technology the like of which the world has never seen, the Chamber points out. New machines, new production methods, new sales and management skills exploded all over the industrial landscape.

The biggest boost in jobs came in the retail trades, in manufacturing, construction and the services industries. And while the number of farm jobs decreased due to increased productivity, these workers found jobs elsewhere, the Chamber points out.

The lesson these figures teach, the Chamber suggests, is that the net effect of better ways of doing things is to create rather than to destroy jobs.

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Boiling Water Reactor Operating

An atomic power plant employing a boiling water type nuclear reactor is in operation in the United States. Details of the design, construction, and operation of this reactor were described at the United Nations' International Conference on Peaceful Uses of Atomic Energy by Dr. Walter H. Zinn, Director of Argonne National Laboratory, on Aug. 9.

The nuclear power plant was constructed at the Atomic Energy Commission's National Reactor Testing Station in Idaho in the fall and winter of 1954-55 by Argonne National Laboratory scientists and engineers, particularly by members of the Laboratory's Idaho Division which is directed by Mr. H. V. Lichtenberger. The development of the boiling reactor, in which steam is generated directly in the reactor vessel, has reduced the process of transforming nuclear energy into usable electric power to its simplest terms. This simplification is expected to be an important step toward the economical production of nuclear power.

Nuclear power plants, as the first step in making electricity, transform the nuclear energy into steam which can be used in steam turbines of conventional types. The simplest way of making the steam is to immerse a nuclear reactor in a tank of water. As the reactor heats up because of the release of nuclear energy, it boils the water, and steam may be drawn off from the tank. This, in essence, is the boiling reactor. Prior to 1953 it was feared that such a reactor might be unstable because of the violent turbulence of the water and steam in the reactor, and its effect on the nuclear chain reaction. Beginning in 1953, Argonne scientists and engineers made a series of theoretical studies and laboratory tests, and constructed experimental reactors, which showed how this problem could be solved. The experiments proved that a properly designed boiling reactor, far from being dangerously unstable is, in fact, safe against accidents which could destroy reactors of conventional design.

The nuclear power plant described by Dr. Zinn consists of a boiling water reactor, a 3,500 kilowatt turbo-generator, a steam condenser, a cooling tower, and control equipment. The reactor consists of 87 fuel elements made up of aluminum-enriched uranium (about 90%) plates suspended in water in a stainless steel tank 16 feet high and 4½ feet in diameter. Fully loaded, the reactor requires about 12 kilograms of uranium 235. Positioned among the fuel elements are four blade-type boron and hafnium control rods (known as shim rods) and one central cross-shaped cadmium control rod.

Since this is a test facility, it was necessary to make arrangements to permit complete change of not only the fuel elements, but of the whole reactor core assembly, including the control rods. To facilitate this, the core assembly is carried on a frame work which is supported in the reactor vessel at the top, just below the flat lid closure. This construction permits the removal of the whole core assembly even after the reactor has been operated and core materials have been activated.

The reactor is made critical by the partial withdrawal of the control rods. The power level of the reactor is then brought up to approximately 1,000 kilowatts. This is sufficiently high so that boiling takes place in the channels of the core. Meanwhile, the temperature and pressure in the reactor vessel rise steadily, but the power level remains constant and smooth. As the temperature and pressure rise, it is necessary to slowly withdraw the control rods further in order to increase the reactivity lost because of the increased tempera-

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ture. When the operating power level and pressure are reached, the steam delivery valve is opened and the machine is in normal operating condition. Steam from the reactor vessel is carried by a six-inch pipe to a turbo-generator. The condensate from the condenser is returned to the feed water supply tank.

Inasmuch as a boiling water reactor delivers wet steam to the turbine, steam separators are used. The large volume of steam in the top of the reactor vessel itself acts in a very effective way to cut down the entrainment of water. Measurements on the quality of steam issuing from the reactor show a value of 98% or better. The radioactivity of the steam due to entrained particulate matter also is low.

The reactor has been in operation during the past two months operating at a thermal power of 15,000 kilowatts. The atomic power plant produces a net of 2,000 kilowatts of electricity. The simplicity of construction, ease of operation, and low cost suggests that this type of small power plant, using enriched uranium as fuel, is suitable for use in remote areas or in conjunction with mining or manufacturing operations.

Wood Shingles Have Longer Life

The National Bureau of Standards says wood shingle roofs have a life expectancy 43 per cent greater than asphalt shingle roofs.

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The Latest: 5-Ton Bridge Attachments

Attachments for the Army's standard 5-ton bridge truck have been developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Virginia, to provide a means of unloading heavy components of military bridges from their transporters without a crane.

Slated for troop tests in the United States and Europe are a hydraulically operated boom, and an "A" frame which can be attached to the front bumper in the field.

Sixteen feet long, the boom can unload equipment from its transporter and from other trucks. It can be extended, retracted, tilted and swung through an angle of 220 degrees.

Consisting of two telescopic box sections mounted on a column near the backboard of the truck, it is operated by a man standing adjacent to the driver's seat.

Control levers are mounted on the front of the swing mechanism. Hydraulic power is furnished by a pump driven by the truck's engine. Outriggers on each side behind the cab add lateral stability to the truck.

Fabricated of standard steel shapes, the A frame is about 20 feet long in a horizontal position and is capable of unloading equipment from other trucks. The unit can easily be disassembled and carried on the truck.

Its lifting power is supplied by the truck winch. Lockout blocks are required for the front spring to prevent excessive deflection. Two "U" bolts are utilized on the backboard to provide "tie-downs" for the back cables. The angle of the boom can be adjusted simply with turnbuckles in the back cables.

The attachments are also capable of placing deck panels on inflated floating bridge pontoons and on fixed bridges.

Steel Would, But Wood Won't

A new electronics building of the Boeing Aircraft Company uses glued laminated wood girders and columns, and frame construction. Why so much wood? Steel would interfere with accurate testing. Wood won't.

Your Pet Project MAY BECOME A PRIZE PAPER

Jot down the ideas you've had for a long time . . .

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Here are the rules:

Any member of the Society may compete regardless of grade of membership.

Papers shall not be highly technical in nature. A clear, concise and interesting coverage is desired rather than complex formulae or derivations. The subject discussed should be of general interest to engineers but should not be of a political or highly controversial nature.

All members of the Society who wish to submit papers in this contest should contact the Secretary as early as possible and not later than February 1, 1956, and request a copy of the rules governing the competition and an outline of the minimum requirements for acceptance of papers. These cover in detail the mechanical make-up which should be followed in preparing and submitting papers for the contest.

Papers must be submitted to the Secretary for acceptance by April 1, 1956. If the Secretary finds that they meet the minimum requirements of the contest, he will forward them to the Awards Committee for review. The papers will be identified by number only. The Secretary of the Society is the only person who will maintain the key to the authors.

If any paper does not comply with such minimum requirements, the Secretary will so advise the author and discuss with him the points which are below the minimum requirements. The papers which are accepted will be forwarded to the Awards Committee for judging not later than May 1, 1956. Papers which have not met the minimum requirements by that time cannot be considered for prizes.

Papers which are accepted will be judged on originality of presentation, editorial merit and value to the engineering profession.

The papers submitted must not have been previously published in substantially the same form. No copyrighted materials shall be used unless permission has been obtained and so indicated. All manuscripts, drawings, etc., are to become the property of the Society and cannot be published without the consent of the Society.

If the papers submitted are NOT of sufficient merit to warrant the award of any or all of the prizes, the Awards Committee reserves the right to award less than the five established prizes or to postpone the competition.

The winners will be announced and the prizes presented at the annual meeting of the Society in June, 1956.

WSE Executive Secretary will furnish you with a complete set of rules and minimum requirements on request.

Wednesday Lunch Meetings Inaugurate New Policy for WSE

Weekly luncheons on Wednesday this year will inaugurate a "New Policy." Emphasis will be placed on promotion of better acquaintance among the members of WSE.

Short talks (10 or 12 minutes) by members who attend frequently will relate personal experiences and are expected to uncover many amusing incidents. Other innovations will be incorporated in the programs to make the lunch hour an interesting respite from the daily routine.

You will be served on arrival from 12 noon to 12:15 p.m. Adjournment will be not later than 1:15 p.m.

Plan now to attend the Wednesday noon "get acquainted" luncheons regularly. The next weekly luncheon is scheduled for October 5.

Frank W. Edwards, manager, Chicago office, Stanley Engineering Company, is chairman of the Luncheon Sub-committee of the Program Committee. John G. Duba, assistant administrative engineer, Department of Public Works, City of Chicago, is vice-chairman of the Sub-committee.

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Industrial Safety Course Added

To meet the increasing need of industry for continued safety programs and practices, a new home study course in Industrial Safety Engineering has been added to the curriculum of International Correspondence Schools, Scranton, Pa., according to John C. Villaume, dean of the faculty.

With the increased use of atomic machinery and processes, management has become increasingly aware of the safety problem. The new I.C.S. course is an engineering approach to the solution and study of this problem.

In the introduction of one of the lessons, it is pointed out that industry's annual accident toll both on and off the job amounts to 48,000 worker fatalities, more than 85,000 permanent disablements, and an additional 4,350,000 non-fatal injuries.

Prepared especially for home study, the Industrial Safety Engineering Course is designed to help industrial supervisors in charge of safety, industrial engineers who desire safety training, safety representatives of labor departments, and those whose responsibilities would call for a knowledge of safety practices in industry.

Comprised of 41 lessons requiring an estimated average study time of 650 hours, the Industrial Safety Engineering Course provides instruction in mathematics, machine sketching, blueprint reading, industrial psychology, handling of materials, plant and production equipment layout, and safety principles and practices.

The new course has been made available on the I.C.S. Selective Plan which permits employers to select only those instructional units which meet an immediate and specific need.

Electronics Confab Slated for Oct. 3-4-5

The Eleventh Annual National Electronics Conference will convene Oct. 3, 4 and 5, at the Hotel Sherman in Chicago. The technical program offers 96 papers covering a broad field of electronic research, development and industrial application, and is supplemented by over 180 booth exhibits by manufacturers foremost in the electronics field.

On the social side, the conference will sponsor three luncheons which will feature a prominent speaker at each function.

The president of the 1955 conference is O. I. Thompson of De Vry Technical Institute, Chicago.

The conference is sponsored by the American Institute of Electrical Engineers, Illinois Institute of Technology, Institute of Radio Engineers, Northwestern University, and the University of Illinois, with Michigan State University, Purdue University, University of Michigan, University of Wisconsin, the Radio-Electronic-Television Manufacturers Association, and the Society of Motion Picture and Television Engineers participating.

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Press Standards

(Continued from Page 4)

for which it was designed, both companies have patented it for dedication to the public. It can be used by anyone without royalty payment.

The idea is especially significant because it portrays the value of committee discussion and how action can be taken when a problem has been set forth and an objective defined. In this case it was the desire to evolve some means of keeping operators from pressing wrong buttons and thus doing injury to themselves, their co-workers or the equipment. Individual companies tried to achieve this goal. The Wisconsin pressroom, mentioned previously in this article, tried to overcome the problem of keeping employees from pressing run buttons when they really meant to press the inch buttons by having only one run button on the press and that located at the feeder. With this arrangement, a person working on the press on plates and blankets could not start the press by pressing the run button because it was no longer there. Other companies removed run buttons at packing cylinders and had only stop and inch buttons at this location. Some blocked out the run button. See figure 3.

Another company connected its start buttons in series. This required a man at each station. All the start buttons have to be closed simultaneously in order to complete the circuit to actuate the magnetic starter on the motor. Since each man is required to be at the station, one cannot start the machine while the other is involved with adjustments. Inch buttons are individually connected. Stop buttons are connected so that each button individually will open the circuit and stop the press. In this arrangement, however, there is always the possibility of the operator jamming a starter closed.

And still another individual answer to the problem was through the installation of a pendant type push-button control station. In this instance the reverse button was removed from the control stations and placed on a pendant type arrangement attached to a reel. The pendant control is moved from unit to unit and is away from the cylinders so that the reverse button cannot be pressed through error.

The safety control offered through the Safety Code appears to be the more simple of the controls. Rewiring to achieve the new effect is neither costly nor time consuming. The safety feature means that both the run and inch buttons have to be depressed at the same time if the pressman wants to run the press and it requires the use of two fingers. If he presses the run button alone it will not cause the press to run. He can press the inch button, however, and use it for his inching functions. This means that an "operator may therefore inch or rapidly start and stop the equipment, when making adjustments, without danger of it starting and continuing to run.

Copies of the Safety Code are available from the American Standards Association, Inc., 70 East Forty-fifth Street, New York City, 17, at fifty cents a copy.

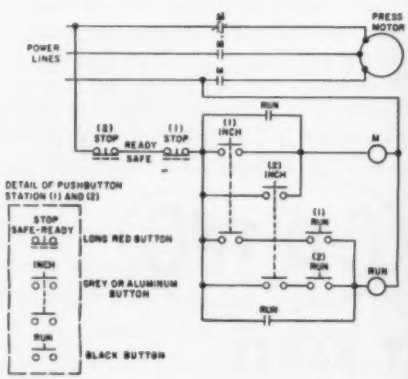

Figure 2: Elementary diagram reproduced from Appendix of the American Standard Safety Code for Controls and Signaling Devices for Graphic Arts Presses, B65.1-1954, for suggested scheme for the "One Finger Inch, Two Finger Run" safety circuit for commercial printing presses.

Noise Symposium To Meet Oct: 20-21

The sixth annual National Noise Abatement symposium will be held Thursday and Friday, Oct. 20 and 21, at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Dr. Robert W. Benson, supervisor in the Foundation's physics research department, has been appointed chairman of the symposium, which is sponsored by the Foundation and several other organizations.

Purpose of the symposium is to bring together persons interested in the effects, measurement, and control of noise.

Wood Cuts Radiation

Civil Defense officials suggest that seeking shelter on the first floor of a frame house would cut exposure to atomic radiation by 50 per cent. For mass sheltering, these officials say one answer may be miles of trenches along main roads—plain dirt trenches covered with boards.

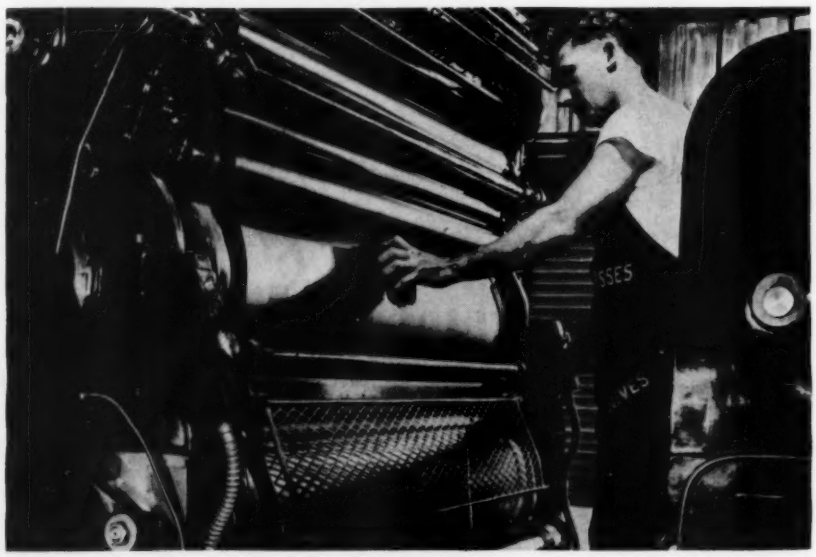

Figure 3: Harris Seybold Offset Unit Showing relations of push buttons to cylinders. Note blocked run button.

Sixth Forum Commences Sept. 26

M. W. Casad, chairman of the Young Engineers' Forum, announces that the sixth Forum sponsored by the Western Society of Engineers will begin on Monday, September 26. The Forum will consist of six weekly dinner meetings to be held in the WSE dining room.

The theme for this Forum will again be "Engineering in Chicago Industry," and the objective is to provide young engineers an opportunity for broadening their knowledge of engineering in the major lines of business in the community.

The men who have been chosen to be speakers at the Forum are leaders in their particular industries. The program has been planned in such a way that there will be ample time for a question and answer period following the speaker's remarks.

Emphasis will be placed on the young engineers having an opportunity to meet and become better acquainted with the speakers and other leaders in the profession during the social hour in the WSE lounge prior to the dinner meeting.

Registration fee for the series of six meetings is $25.00. Primarily the group is comprised of young engineers who are sponsored by the companies employing them. However, individual reservations will be accepted by the secretary's office until the enrollment limit of 125 is reached.

Following is the Forum program:

September 26 — Steel
Joseph L. Block, President, Inland Steel Company

October 3 — Chemical
Louis Ware, President, International Minerals & Chemical Corporation

October 17 — Accounting
Leonard Spacek, Partner, Arthur Anderson & Co.

October 24 — Electronics
W. W. McDowell, Vice President in charge of Engineering, International Business Machines Corporation

October 31 — Construction
Edgar K. Collison, Vice President, George A. Fuller & Company

November 7 — Heavy Manufacturing
N. C. Dezendorf, Vice President, Electro-Motive Division, General Motors Corporation

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Road Builders Ready National Conference

Plans have been completed for the American Road Builders' Third National Conference of County Highway Engineers and Officials, to be held in Gatlinburg, Tenn., Sept. 12-14. More than 500 highway officials from counties and communities across the country are expected to gather in the picturesque town in the heart of the Great Smoky Mountains to hear national leaders on local highway problems.

The conference, which has attained great prestige as an instructive forum for local highway engineers, is under the direct sponsorship of ARBA's County and Local Roads Division.

Delegates this year will hear some of the best-informed highway authorities in the nation, addressing themselves to the general theme of "County Highway Administration and Management."

The meeting will open in the Greystone Hotel in Gatlinburg at 9:30 a.m. on Sept. 12. A major address will be delivered that morning by ARBA President John N. Robertson, director of highways of the District of Columbia.

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The Young Engineer

(Continued from Page 6)

greater responsibility in civic affairs, in all areas of public service and as a humanitarian. His training make it clear to him that the essential basis of human progress is expanded knowledge."

There is little one can add to the observation.

Except this: To emphasize that working for a city like Chicago and watching it grow, and to know that you had a vital part in its physical growth and development, gives one a feeling of personal satisfaction and an emotional warmth.

To watch a modern highway, or a giant bridge, or a handsome parking structure develop from the first few lines on a drafting board into a thing of beauty and utility, to be used by millions for years to come, and to know that somewhere along the line, he had a hand in producing the finished product, certainly gives the city engineer a glow of pride.

He can surely say: "I am part of the Big City; I helped make it; its great highways, its fine bridges; its water works; it sewers. Without me and the hundreds of engineering associates, who would build the City? Everything that we plan and build will be used by millions of people for many, many years to come. These things are monuments to our skill and our sweat; the City needed these things and we put our imagination and technical skills to work and produced them. Not only things of beauty but also of utility. I am part of the Big City and I am proud."

Model House Has Range of Plywood

A kitchen stove of hardwood plywood is one of the many unusual features of a "House of Tomorrow" built recently near Long Beach, Calif. The plywood kitchen range houses magnetic coils which set up eddy currents in the cooking utensils. This does the actual cooking. The utensils are suspended two inches above the surface of the stove by means of magnetic repulsion, and the wood range never gets hot.

Edison Company To Build Atom Plant

Commonwealth Edison Company on July 22 signed a contract with General Electric Company for the construction of a nuclear power plant to be built entirely with private funds at a cost of $45,000,000 it was announced by Willis Gale, chairman of Commonwealth.

The contract calls for the building of the 180,000-kilowatt boiling reactor plant which was announced on March 31, 1955, when Commonwealth, on behalf of Nuclear Power Group, filed a proposal with the Atomic Energy Commission.

Signing the contract for Commonwealth was its president, John W. Evers, and for General Electric, Francis K. McCune, vice-president and general manager, Atomic Products Division.

The plant will be built on the Illinois waterway 47 miles southwest of Chicago. Its output will feed into the Commonwealth Edison system serving Chicago and Northern Illinois.

The plant, to be owned and operated by Commonwealth, is co-sponsored by eight companies which are sharing in the developmental expense of the project. It is the largest all-nuclear plant yet scheduled.

Simultaneously, it was announced recently that the eight sponsoring companies had formally incorporated to carry out the research and developmental part of the construction.

The new corporation, which is called Nuclear Power Group, Inc., succeeds an informal organization of a similar name which the participating companies have maintained for the last two years.

Announcement of the incorporation was made by Philip Sporn, president of American Gas and Electric Service Corporation, who is president of the new company.

Directors, representing the sponsoring companies, are: Philip Sporn, American Gas and Electric; S. D. Bechtel, Bechtel Corporation; T. A. Schlink, Central Illi-

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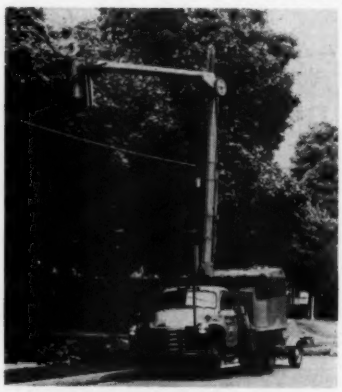

nois Light Company; Willis Gale, Commonwealth Edison Company; Allen Van Wyck, Illinois Power Company; H. B. Munsell, Kansas City Power & Light Company; J. B. Black, Pacific Gas and Electric Company; J. W. McAfee, Union Electric Company of Missouri.

Of the $45,000,000 contract price of the nuclear plant, Commonwealth Edison will pay $30,000,000 while the Nuclear Power Group members will pay the balance of $15,000,000 as developmental expense.

The plant is scheduled for completion by 1960. The actual construction work at the plant site will be preceded by extensive engineering and developmental work.

Quick! What's the Answer

Electronic business machines may soon talk back, according to *Electronics*. Tomorrow's businessman might dial a computer's extension, then an account number, and listen to the answer via magnetic recording.

Meet to Consider Atom Raid Safety

How much money should a company spend, and what ways should it be used, to provide protection against atomic attack?

These and related questions will be discussed Nov. 17 at a conference on "The A-Bomb and Industry—a Prescription for Survival" sponsored by Armour Research Foundation of Illinois Institute of Technology, Chicago.

Several hundred Midwest industrialists are expected to attend the conference to be held on the Illinois Tech campus.

Subjects scheduled for discussion, in addition to the economics of A-bomb and H-bomb protection, include:

—The danger faced in the event of an atomic attack.

—Protection possibilities, including dispersion of industry, underground construction, and strengthening of existing buildings.

—Industry operation under emergency conditions, continuity of management, and location and preservation of vital records.

—Protection construction in designing new buildings and in strengthening old ones.

The question of "how much money should be spent for how much protection" must be solved if a sound program of plant protection is to be developed, according to conference chairman Raymond W. Sauer, supervisor of the Foundation's structural research group.

"Attempts to provide protection for all of the country's industrial establishments would be far too costly to be undertaken," Sauer explained.

"Some formula must be devised to serve as a guide in established priorities for the protection of selected operations within the individual companies, as well as among the industrial areas."

Conference speakers will include authorities representing industry, government, and educational and research institutions.

Cavendish Lab Sets Up Fellowship

The establishment of a fellowship at the famed Cavendish Laboratory at the University of Cambridge, England, was announced by Horizons Incorporated, the unique industrial and governmental research organization of Cleveland.

The post-doctorate grant is for work in the field of physics and chemistry of the solid state and will be done under the guidance of Professor N. F. Mott, director of the Cavendish Laboratory.

Fees, tuition, living expenses and other emoluments usually associated with such study grants are covered in the fellowship.

"Both industry and government research consciousness since the war has increased the need for scientific personnel so much that the demand far exceeds the supply," said Dr. John T. Burwell, Horizons' associate director of research. "In order to overcome this problem, Horizons Incorporated has decided to actively assume the responsibility in assisting in the training of such personnel."

Applicants for the fellowship should write to Dr. John T. Burwell, associate director of research, Horizons Incorporated, 2903 East 79th Street, Cleveland 4, Ohio.

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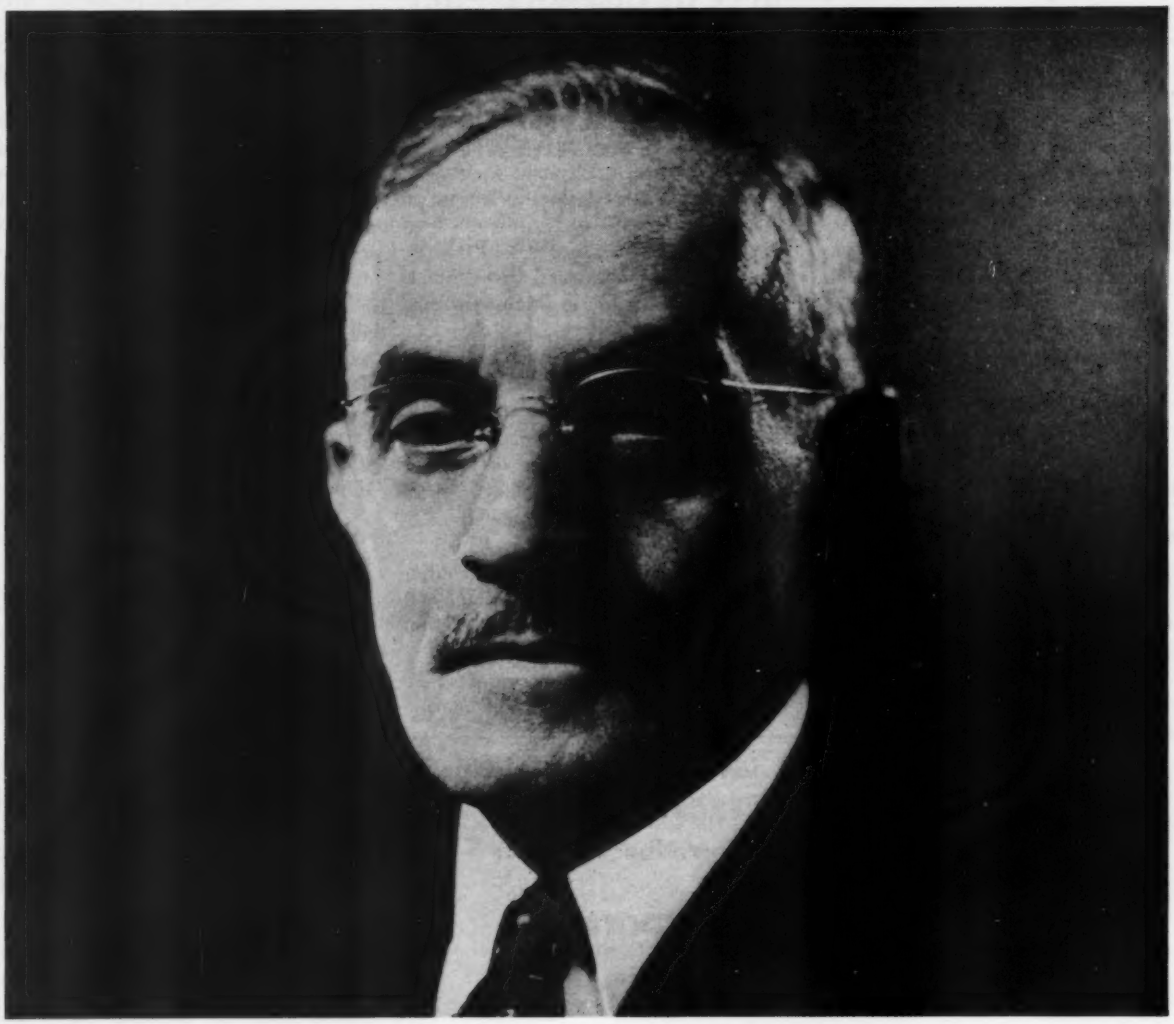

In Honor of:

Dr. Gustav Egloff

In the death of Dr. Gustav Egloff, Past President of Western Society of Engineers, on April 29, 1955, the Board of Direction, Officers, and fellow members have lost a distinguished associate whose capabilities and friendly personality had won for him their highest esteem. Chicago, too, has lost one of its outstanding research scientists in the petroleum industry.

Dr. Egloff's long and varied experience in the petroleum industry, his ability to meet each new challenge with a fresh and vigorous approach, and his many contributions in the scientific field had won him international acclaim.

Dr. Egloff gave generously of his knowledge and time to Western Society and was President of the Society in the year 1949-50. He was active in all phases of the Society's development, particularly those for the benefit of the younger engineers. In 1939-40 he was awarded the Octave Chanute medal by the Society for his outstanding service to the field of science. The Washington Award was conferred upon him in 1953.

RESOLVED: That this Memorial be recorded in the Minutes of this Meeting, and that the Secretary of the Society send a copy thereof to Mrs. Egloff as a token of our deepest sympathy.

H. P. Sedwick
Robert H. Bacon
William V. Kahler

Ill. State Geological Survey Is 50

Its fifty years of research, publication, and public service on the coal and other mineral resources of Illinois will be commemorated by friends and "alumni" of the Illinois State Geological Survey, State industrial leaders, and delegates of universities and colleges, on Oct. 11, 1955, in Urbana-Champaign.

The steady development of the Survey since 1905 has been phenomenal among the state surveys of the country. It was recently climaxed by the construction of the Natural Resources Building, the Experimental Research Laboratory, and accessory units, all located on the South Campus of the University of Illinois, at a total cost of about $3,500,000. Some 40 laboratories are specially equipped to more fully develop the Survey's information obtained from field investigations and mapping. The Survey's whole program is geared to furnish the information needed by a populous manufacturing and agricultural state.

Some 75 professional research scientists and 50 assistants and technicians, with modern scientific equipment at their command, enable the Survey to carry out both fundamental and applied research—applied research to meet present needs and fundamental research to pave the way for a greater Illinois.

Thurlow G. Essington, chief counsel of the Illinois Coal Operators' Association, Chicago, will preside at the forenoon session. Morris M. Leighton, MWSE, chief emeritus of the Survey, who had a career of 31 years as chief, will address the gathering on "The Survey's response to the economic pattern of the past fifty years."

J. R. Van Pelt, president of the Montana School of Mines and director of the Montana Bureau of Mines and Geology, will be the principal speaker at the mineral industries luncheon to be held in the Illini Union. An interesting afternoon symposium has been planned in which industrial leaders will participate. B. R. Gebhart, vice-president, Freeman Coal Mining Corporation, Chicago, will discuss "The relation of coal research to the economy of the State." Leaders in petroleum and industrial minerals will discuss their fields.

The fiftieth anniversary jubilee banquet will be held in the Illini Union Ballroom at 7:00 p.m. Judge Vera M. Binks, first woman member of the governor's cabinet and director of the State Department of Registration and Education, will be mistress of ceremonies. Advance reservations may be made by addressing George M. Wilson, Room 100, Natural Resources Building, Urbana, Illinois. Copies of the program and a historical review may also be obtained.

In the forenoon of the following day there will be a tour of the Survey's laboratories, and in the afternoon the Survey will be host to the Association of American State Geologists.

Philanthropy Experiences Change

There's a new trend in American philanthropy, the Chamber of Commerce of the United States reports: More and more large corporations are establishing new funds to help colleges and universities.

Estimates based on U. S. Treasury figures are that corporate gifts to higher education have increased from $50 million in 1950 to almost twice that amount today. A large part of this increase, of course, reflects the general increase in all corporate gifts. But the Council for Financial Aid to Education, Inc., of New York, believes that higher education's share of the philanthropic dollar probably has been boosted from 20 per cent (in 1950) to 25 per cent today.

Within the past year, or so, says the Chamber, several of America's largest firms have instituted great new programs of financial aid to colleges and universities. A steel firm will give $1 million this year; another $1 million will be given by an electrical firm, while an auto firm has added $2 million to a program already totalling $2.5 million and intended to increase by $2.5 million more, in the next four years.

Many more millions will be given by other firms this year and in the immediate future, the Chamber says. Significantly, small liberal arts colleges, as well as technical institutions, are sharing generously in these corporate gifts.

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Instrument Society To Meet Sept. 12-16

The Instrument Society of America is holding its 10th Annual Instrument-Automation Conference and Exhibit Sept. 12-16 in Los Angeles, Calif. This is the instrument-automation industry's principal educational event and will bring together about 15,000 engineers, educators and business executives.

The conference program will consist of over 280 concurrent sessions combining technical meetings, instructional courses, and round-table discussions on the design, application and maintenance of all types of measurement and control instruments. Included among the papers to be presented at the conference are those sponsored by the American Society of Mechanical Engineers, American Institute of Electrical Engineers, Institute of Radio Engineers and Southern California Meter Association.

About 300 instrument manufacturers will exhibit their new developments and standard lines. Government agencies will also be represented by exhibits from the Department of the Navy, Department of the Air Force, United States Atomic Energy Commission and the National Bureau of Standards.

Midwest Research Forms New Division

With the increased demand for knowledge of markets and business conditions, Midwest Research Institute, Kansas City, Mo., announced on May 27 the formation of a new division specializing in supplying needed data to industry.

The new division, to be known as the Industrial Economics Division, is the outgrowth of a group at the Institute which was formerly called Engineering Economics. In announcing the new division, Dr. Charles N. Kimball, president of Midwest Research Institute, stated: "The intense interest on the part of businessmen in determining factual material for reorganization, expansion and product development, has necessitated our enlarging our activity in this field and establishing this new division. It will not only work on sponsored projects by companies, industrial development commissions and chambers of commerce, but will also develop various surveys on its own which will be of interest to American business."

Among the areas in which the Industrial Economics Division will operate are market research for industrial and consumer companies; industrial location surveys for companies, communities and areas; fundamental studies on requirements and growth of the American economy; developing criteria for betterment of cities and areas; studies for various groups on how such organizations as chambers of commerce and state commissions can help individual members; input-output studies for industries and areas.

The new division is staffed by men professionally trained in market research, data analysis, and chemical engineering. It has every-day access to the 200 different scientists and engineers on the Institute staff.

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on page 2

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Solar Energy Meet Is Set for Nov. 2-4

A world conference on scientific basis of applied solar energy will be held at the University of Arizona, Tucson, Oct. 31 and Nov. 1 as a prelude to the World Symposium on Applied Solar Energy to be held in Phoenix Nov. 2-4.

Both the Tucson and Phoenix meetings will be jointly sponsored by the Association for Applied Solar Energy, Stanford Research Institute and the Universtiy of Arizona.

Scientists from many countries are expected to attend the Tucson conference to exchange ideas on fundamental principles involved in the application of solar energy. They will then move on to Phoenix to discuss the technological aspects of the practical utilization of solar energy with world-wide representatives of industry, agriculture, finance and education.

One of the major objectives of the meeting at the University of Arizona will be to assist scientists in charting the direction of future research. The conference will permit free discussion of the scientific bases upon which the utilization of solar energy is founded. Following a general session, three sections will convene to discuss thermal, photochemical and electrical processes for converting the sun's energy to man's use.

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Gamma Ray Effect to Be Studied

Argonne National Laboratory placed into operation on Aug. 6 a large irradiation facility for studies of the effects of gamma radiation on foods and other materials. Simultaneously, the Laboratory announced the availability of this new facility to non-Laboratory users as a part of its program of providing assistance to industrial organizations, educational institutions, and Government agencies for the development of peacetime uses of atomic energy.

One of the first users will be the Army Quartermaster Corps. Under the direction of the Quartermaster Food and Container Institute for the Armed Forces, the Quartermaster Corps has recently begun a broad study of the sterilization of food by irradiation. The long-range objective of this study is to determine if foods can be preserved by irradiation as a substitute for present treatment by heat, chemicals, and other processing without detracting from their natural color, flavor, odor, and texture.

The irradiation facility, which was designed under the direction of Phillip Fineman of the Laboratory's Chemical Engineering Division, makes use of highly radioactive uranium fuel elements which have been discharged from the Atomic Energy Commission's Materials Testing Reactor located at the National Reactor Testing Station in Idaho. Each fuel element provides about 70,000 curies of gamma radiation. Experiments are conducted in a metal rack which holds up to twelve fuel elements in a vertical position. Between the fuel elements are spaces for the materials to be irradiated. The rack rests on the floor of a 55,000 gallon pool of water, which is about 20 feet deep, 30 feet long and 15 feet wide. The water serves to shield the personnel from the radiation being emitted by the fuel elements. Operation of the facility will be directed by Miss H. Gladys Swope, MWSE, of the Chemical Engineering Division of the Laboratory.

The operational procedure for food irradiations is as follows: the material is sealed in number 2 cans prior to delivery to the irradiation facility. Here, the cans are placed in twelve aluminum-stainless steel cylinders or urns which can accommodate five cans each. The loaded cylinders are then lowered into the water by means of a hoist and are placed vertically between the fuel elements. To insure uniform exposure to the gamma rays, each cylinder is rotated slowly during the irradiation period. To remove the materials, the process is reversed.

Although the first major use of the facility will be concerned with the study of food preservation, the new facility is not limited to such studies. Other materials which do not exceed four inches in diameter and 28 inches in length can be accommodated.

Oldest Area Steel Works Celebrates

South Works of United States Steel Corporation observed its 75th Anniversary Aug. 17-18. The program included a luncheon for civic and community leaders at the South Shore Country Club on Aug. 17, and an open house for employes and their families on the 18th.

The United States Steel Hour television program on August 17 saluted South Works. The program was carried on a 110 CBS station network from coast to coast.

Ground was broken for South Works, oldest steel plant in Chicago, on March 22, 1880. Steelmaking operations began March 26, 1881. At the beginning the plant employed 2,000 persons. It now employes more than 14,000 and ranks as the third largest steel mill in the world with a capacity of nearly 5½ million ingot tons annually.

South Works is famous for many "firsts" in steel production: The slogan "Safety First" originated at South Works. It is the stainless steel center of all United States Steel plants. But its greatest achievement lies in the fact that more steel executives have been graduated from South Works than from any plant in the nation. The roster of former general superintendents of South Works is a blue book of pioneers in the steel industry.

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CRERAR LIBRARY
News and Notes

An important bibliographic activity to which the Library devotes such effort as is feasible is the compilation of detailed guides to the collections. For the field of metals a 17-page exposition was published last fall. Just completed is a 43-page "Guide to Cancer Literature in the John Crerar Library," listing abstracting and indexing sources, current and deceased periodicals, and all books and monographs published 1940 through 1954 on cancer and in the Crerar collections. Grants from the Illinois Division, American Cancer Society have made possible unusually extensive holdings. Compilation of the guide was done by Roger Martin, of the Librarian's office.

* * *

Of greater magnitude is a catalog now being planned for the Clifford Grulee Pediatric Collection. Under a grant of $12,500 from the Gerber Baby Foods Fund, the project will first enable the Library to complete the cataloging of one of the country's most important collections, given over a period of time and still supported by Dr. Grulee. A chronological listing, with complete author and detailed subject indexes is contemplated; sale of the catalog will assist in covering full costs of the project and continuing maintenance of the collection.

* * *

On initiation of Crerar's librarian, the sixteen member research libraries of the Midwest Interlibrary Center recently completed a detailed checking of holdings of the 4,800 periodicals indexed by Chemical Abstracts. Crerar Library was found to have the largest percentage of any library, but only a little more than 50%. It was discovered that 933 titles are not in any of the member libraries. Action taken at a recent meeting of the group directs efforts toward reducing the number of unavailable titles and completion of existing partial files.

Vibrator Developed For Aircraft Study

Units to produce artificial vibrations in aircraft while in flight or on the ground have been developed for the Wright Air Development Center by the engineers of Midwest Research Institute of Kansas City. The units will be used for structural evaluation studies.

In compliance with stringent operational, weight and size requirements for the project, Midwest developed two units which can be operated in synchronism within 10 degrees over a speed range from 0 to 500 rpm or, by means of a selector switch, can be operated 180 degrees out of phase with each other.

One unit, termed the "master," is so designed that one motor-amplidyne-amplifier combination has a variable speed to meet the needs of the particular test, and is synchronized with the other unit, termed the "slave," by means of a position servomechanism which adjusts the motor shaft at all times in correspondence with the "master."

Since no industrial equipment was commercially available which met the power and weight requirements for the project, Midwest turned to the turret drive system used in the B-50 bomber, a unit which packed the highest power rating within the smallest possible volume and weight. These units are available on the surplus market.

In addition to studies on aircraft, the test equipment is also applicable to a wide variety of other types of vibration studies in machines and structures or wherever synchronized vibrators are necessary for the excitation of symmetrical and anti-symmetrical modes in vibration studies.

A Hot Idea

When you mention 2 by 4's most folks think of the 2 by 4 wood studs used to frame the walls of houses. That's one of their most popular uses. A more unusual use for 2 by 4's, reports the National Lumber Manufacturers Association, is to skim slag from molten iron. A metal skimmer would melt, the lumbermen point out.

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C-3408 Geologist. Geol. Age: Up to 40. Recent grad. or better with training in minerals. Know: economics and marketing. Duties: handling geological problems within research div. &/or studies on economics & markets and related fields. For Mfr. of fertilizer. Sal: $350-$600 Loc: N.W. Chgo. Suburb. 25% traveling. Car helpful.

C-3391 Works Mgr. Eng. Degree. 5 plus yrs. as plant mgr. in plant with multiple processes & products & preferably in paper. Know: overall engrg. & adm. of all mfg. functions. Duties: the initiation, & adm. of design, instal., & supv. of all controls, procedures, systems, & methods for coordinating all line & staff mfg. activities for several plants. For Mfr. of paper products. Sal: $10-20,000/yr. Loc: Chicago.

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C-3358 Tech. Director Paper. Chem. or Chem. Engr. Age: 35-50. 3 plus yrs. in paper or paper converting, product devel., or research. Know: coated papers helpful. Duties: in charge of quality control, standards grades of papers research on product devel., & processing. For Mfr. of paper. Sal: $10,000-$12,000 Location: Chicago. Employer will negotiate fee.

C-3356 (a) Staff Mech. Engr. Plant ME Age: to 45. 5 plus yrs. exp. in supv. multiple plant preventative maint. programs. Know: bldg. material mfg. helpful. Duties: acting as staff mech. engr. on VP's. staff planning promoting, & supv. preventative maint. programs, machinery replacement or repair, cost reduction programs & consulting on general plant maint. work. For Mfgr. of bldg. mat. Sal: Up to $12,000 Loc: Chicago Hdq. Considerable traveling.

C-3341 Res. & Dev. EE Age: 25-35. 5 yrs. exp. electronics res. & devel. know: Radar system engrg. Duties: system analysis, electronic circuit design, pulse circuits. For a gov'ts. res. Sal: to $8000. Loc: Chicago Empl. will neg. fee.

C-3328 Manuf. Mgr. Chem. Engr. or Chem. Age: 45-60. 5 yrs. exp. in chemical industry as plt. mgr. & pref. in physical chemical work. Know: Plant maint. Duties: resp. of complete production of 2 plants. For Mfr. of heavy chemicals. Sal: $20,000 Loc: 300 miles. within Chicago area.

C-3306 Ch. Engr. Pumps ME or Equiv. Age: 35-55 10 plus yrs. in design with at least 5 yrs. in resp. des. of centrifugal pumps. Know: appl. of pumps. Duties: reporting direct to wks. mgr., resp. for dept. of 4 or 5 engrs. on design of single & double suction, non-clog type of pumping eqpt. Should have some field exp. in add. to design. For Mfgrer. Sal: $7500-$10,000. Loc: Chicago. Employer will negotiate fee.

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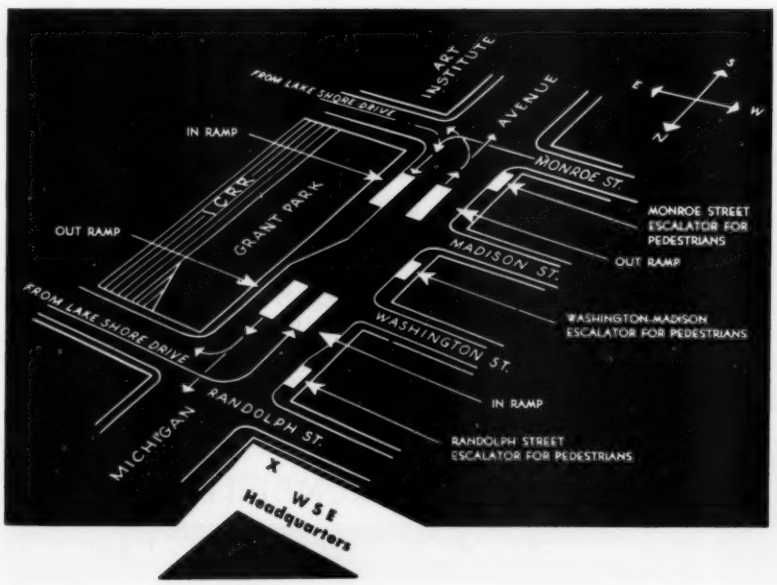
Below: map showing Park Department Underground Garage



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On Training —
Letters from Leaders

In the last issue of Midwest Engineer we published another of about thirty letters received from leaders of Chicago-area firms concerning shortcomings noted in the engineers in their employ. Many of the letters also suggested what the engineers should do to correct their deficiencies.

Significantly, the engineer's technical training is generally considered adequate. In the broad area of Human Relations, however, engineers seem often to be "under achievers," according to the viewpoint of the industrial leaders as reflected in their letters.

We are printing **the last** of these letters in this issue. Although the letters may be of greatest value to the younger engineers, we hope that all of the engineers who read them will benefit.

Here, then are the last letters:

Dear Mr. Becker:

This is in response to your letter of August 31.

I do not feel that my personal views regarding the subject under review would be of any particular value.

Therefore, I am asking the Head of our Engineering Division to respond to your request, and I am sure that he will consult with our personnel Vice President.

Sincerely yours,
(Signed)

Dear Mr. Becker:

I have your letter of August 31, addressed to .... who has asked me to reply to it.

Our own experience with engineers leads us to a view which is quite direct and that is that nothing but ambition and a desire to move ahead and into other fields, such as executive fields, is what is required.

We here try to provide every opportunity for the promotion of any thoughts that our engineering personnel may have and I think basically the problem which exists, if there is a real problem, is that of getting the engineers to lift their viewpoints to the goal which they may ultimately want. Many engineers prefer to remain in the strictly technical phases of the business. Others desire management positions in engineering. Some, of course, wish to move into executive positions in the business.

I think the basic view of this matter is that most employers are willing and anxious to see their technical personnel develop to the point where they can assume more and broader responsibility. The problem is to be sure that the engineer himself picks his goal and works toward it.

If there is any further information we can give, we would be glad to supply it.

Very truly yours,
(Signed)

A Day for Nothing

Another "end-to-end" calculation has just been made—this time by a retail food chain, *Food Engineering* reports. It showed that a 600-mile-per-hour jet plane would take 23½ hours to fly through the 300,000,000 doughnuts sold by the chain.

WSE Personals

F. D. Troxel, MWSE, is to serve the firm of Vern E. Alden Co. as a consulting engineer in Phoenix, Ariz. He has resigned as senior electrical engineer and as a partner in the firm.

* * *

Milton S. Aronstam, MWSE, member of the staff of the Federal Civil Defense Administration, at Battle Creek, Mich., began duties as 1955-1956 president of the Tri-State College Alumni Association, on Aug. 6, at the conclusion of the 1955 Alumni Reunion held on the Tri-State campus at Angola, Indiana.

Aronstam was graduated from Tri-State College in 1932 with the bachelor of science degree in civil engineering and is a registered professional engineer. He will head the more than 10,000 alumni of Tri-State residing in all of

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the 48 states, in the territories and in 67 countries.

Active in alumni activities, Aronstam has served the Alumni Association as committee chairman, as director, and during the past year as vice-president and head of the alumni chapter committee. He previously served two terms as president of the Chicago Alumni Chapter, before moving to Battle Creek.

Former chief of the Health and Safety Division of the U. S. Atomic Energy Commission in Chicago, he served as a member of President Eisenhower's Conference for Industrial Safety in 1953 and on former Governor Stevenson's advisory committee on radiological and industrial safety. He also served on numerous committees on national codes and standards. Professional groups of which he is a member, besides the Western Society of engineers, include the American Society of Civil Engineers, American Society of Safety Engineers, and the National Safety Council.

* * *

E. A. Schmidt

The I-T-E Circuit Breaker Company of Philadelphia announces the appointment of **E. A. Schmidt,** MWSE, former Chicago district manager, to the newly created position of midwest regional manager, effective Aug. 1. This regional office will be located in Chicago and will include the sales and engineering offices in Detroit, Cleveland, Cincinnati, Indianapolis, St. Louis, Kansas City, Omaha, and Minneapolis.

* * *

Winifred M. E. Hutton, MWSE, the second woman ever to receive a structural engineer's license in the state of Illinois, has left Naess & Murphy in Chicago to accept a position as structural engineer with the Bechtel Corporation, the large oil development organization, operating from main offices in San Francisco.

* * *

George K. Raider, MWSE, formerly manager of the Multi-Vent Division of The Pyle-National Company, has been appointed division manager in charge of railroad and turbine sales. Pyle-National manufactures electrical equipment and air conditioning machinery for railroads and other industries.

Natural Wood Sells Apartments

If you want to sell your home or rent your apartment in a hurry, install natural wood cabinets in the kitchen, the National Lumber Manufacturers Association advises. Home builders and apartment developers in all sections of the country give natural wood kitchen cabinets a major share of credit for the quick sale and rental of their properties, according to NLMA. In a number of apartment projects, wood cabinets originally were chosen for their ability to withstand the abuse of successive tenants. As things turned out, the fashion appeal and warm friendliness of the cabinets proved to be an equally important factor.

Work Is Simplified

An all-out cost reduction program, involving a series of courses on work simplification taken by all executives, 55 supervisors, 145 staff and technical people and 110 hourly employees, has saved a Texas instruments firm $745,000 in two years' time, *Factory Management and Maintenance* says. The safety course takes 12 weeks, two hours per week, for supervisory and staff personnel, and six weeks, two hours per week, for hourly employees.

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Reviews of Technical Books

Water Supply Engineering

Water Supply Engineering, by Harold E. Babbitt and James J. Doland, McGraw-Hill Book Company, New York 36, N. Y. Fifth edition, 1955. 608 pages. Price $8.50.

The new fifth edition of this useful text has been considerably revised and brought up to date. The authors have included many new tables and illustrations and have modernized the problems in the appendix. These problems make the text useful for college courses in water works engineering. Many new references have been added in order to provide leads for further study of particular topics. The book is primarily a presentation of the basic engineering data and equipment commonly used in water supply engineering work. Some of the topics covered are hydraulics, wells, dams aqueducts pumping equipment, valves and controls, storage and distribution systems, water chemistry and filtration. The sections on water chemistry and filtration are particularly well written and include excellent reference listings. The only fault one could find with the text is that a few of the older outdated concepts seemed to have carried over from the fourth edition. The section on butterfly valves is very mis-leading when one considers that this equipment is now being manufactured by numerous concerns under the 1954 specification A.W.W.A. C504-54T for perfectly tight shutoff in water works service at pressure up to 125 p.s.i.g. This small omission, however, does not detract from the fact that this book remains one of the most useful reference volumes for engineers working in the water supply field.

A.J.B., W.S.E.

Vapor-Plating

Vapor-Plating, by C. F. Powell, I. E. Campbell, and B. W. Gonser, John Wiley & Sons, Inc., New York 16, N. Y. First edition, 1955. 158 pages. Price $5.50.

This concentrated source of information of the formation of metallic and refractory coating by vapor deposition is sponsored by The Electrochemical Society.

Dealing solely with chemical processes, "Vapor-Plating" describes and gives critical reviews of general techniques, together with their past and present applications. The conditions required for the deposition of pure metals, carbides, nitrides, borides, silicides, and oxides from gaseous mixtures of their vaporized compounds are discussed here.

While by no means pretending to be a comprehensive and detailed reference source, the volume supplies additional pertinent data that suggest the widening applications of this flexible and versatile tool. This information includes the properties of new coatings and the bases on which they may be deposited, as well as the conditions suitable for their applications. Other data indicate the general fields of utility, and many unusual characteristics of vapor-deposited materials.

All three authors are at the Battelle Memorial Institute. Powell is associate consulting chemist. Dr. Campbell is chief of the division of inorganic chemistry and chemical engineering, and Dr. Gonser is a technical director at the Institute.

F-M Limiters and Detectors

F-M Limiters and Detectors, by Alexander Schure, John F. Rider Publisher, Inc., New York 13, N. Y. First edition, 1955. 48 pages. Price $ .90.

Written for the technical institute, vocational school or junior college student, it provides a review of the basic concepts of circuits as well as the applications of f-m limiters and detectors. Also suitable for use by the practicing technician who desires a deeper insight into the workings and uses of the circuits, this book covers the subject of f-m limiters and detectors as applied to all frequency modulated signal systems.

Dr. Schure takes special pains to display the panorama of growth of this circuitry beginning with the slope detector and the double-tuned discriminator; then he advances into the circuit operation and function of various modern f-m detectors, including the Foster-Seeley discriminator, the ratio detector and the gated-beam tube. In similar fashion the use and operation of f-m limiter circuits is discussed.

Special effort was made to fit the contents of this review book to the variety of texts used in the many different technical schools of the nation. Special emphasis and detailed explanations are given to those phases of the subject which the students may find confusing in their initial studies.

Vectors, presented in the most understandable manner, are used as explanatory tools. The mathematics employed is held to the level compatible with the training in the kinds of schools mentioned above. Review questions are included at the end of each chapter.

Chapter titles are as follows: Forerunners of Modern F-M Detectors; Limiters; The Modern F-M Discriminator; The Ratio Detector; The Gated-Beam Tube.

Diesel, Aircraft Power Honored in Chicago

A giant outdoor exposition portraying the dramatic contribution of Diesel and aircraft power to America's industrial economy will be staged by General Motors on Chicago's lakefront August 31 through September 25.

Biggest show of its kind ever presented, the spectacular "General Motors Powerama" will be open to the public in a 23 acre area on South Lake Shore Drive, adjacent to Soldier Field. This was the site of the Century of Progress exposition in 1933-34.

Admission to the 26-day "world's fair of power" will be free. The show will celebrate production this year of GM's 100 millionth Diesel horsepower.

Entertainment on the colorfully decorated Powerama grounds will range from stage shows with singing and dancing to exhibits showing actual operation of the modern locomotive, saw mill, cotton gin, earth mover, and many other mechanical giants.

Introduced to the public at the Powerama will be a lightweight, low-cost passenger train designed and built by General Motors' Electro-Motive Division at La Grange at the request of a committee of railroad presidents. This Diesel-powered train will be able to carry 400 passengers at speeds of more than 100 miles an hour.

A U. S. Navy submarine, a pleasure launch, shrimp boat, and other marine equipment will be displayed along a specially-built pier in Burnham Park lagoon. Visitors will be able to board these craft.

A stage show will be presented four times daily in a huge outdoor theater on the lakefront.

Yes, Sir, And Space Guns, Too?

Toy water pistols are standard equipment at a Montana oil refinery, according to *Power*. Workers squirt them at pipes to be handled, thereby finding out if the pipe is sizzling hot without burning their fingers. The pistols also are a sanitary alternative to spitting on the pipes, the magazine notes.

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WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

11-55 John S. Saridan; Librarian, Engrg. Library, Portland Cement Assn., 33 W. Grand Ave.

12-55 John E. Birch (Trsf.), President, J. Birch & Company, 3331 Oak Park Avenue, Berwyn, Ill.

13-55 Joseph P. Desjardins (Rein.), Engineer, Webster Manufacturing Inc., 343 S. Dearborn St.

14-55 R. A. Budenholzer, Prof. of Mechanical Engrg., Illinois Institute of Technology, 3300 Federal St.

15-55 Donald J. Mertz, Manager, Mutual of New York, 208 S. LaSalle St.

16-55 William F. Gordon, 8036 Kostner Ave., Skokie, Ill., — attending Purdue University.

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Also featured at the Powerama will be GM's XP-21 Firebird, first gas turbine automobile built and tested in the United States, plus seven experimental "dream cars" and a "dream truck."

But the top stars of the Powerama will be the big-muscled members of the GM family—the dump trucks, locomotives, scrapers, tractors, boats, and a variety of engines and other equipment.

GM divisions with exhibits at the Powerama will include Allison, Cleveland Diesel, Detroit Diesel, Diesel Equipment, Electro-Motive, Euclid, Fabricast, Frigidaire, and GMC Truck & Coach.

Here are a few of the exhibits planned for the Powerama:

The world's largest dump truck.

An M-48 Tank with the control apparatus *outside* where specators can watch an operator control the steel monster.

A full-scale model of a vertical rising aircraft, showing how the "Pogo" plane takes off "straight up."

An F-89 "Scorpion" fighter plane.

An oil drilling rig in actual operation.

An operating saw mill, cutting up giant timber.

An operating cotton gin.

Scores of other exhibits including the latest developments in Diesel-powered transportation, plowing demonstrations, earth-moving demonstrations, and a variety of engines and cutaways.

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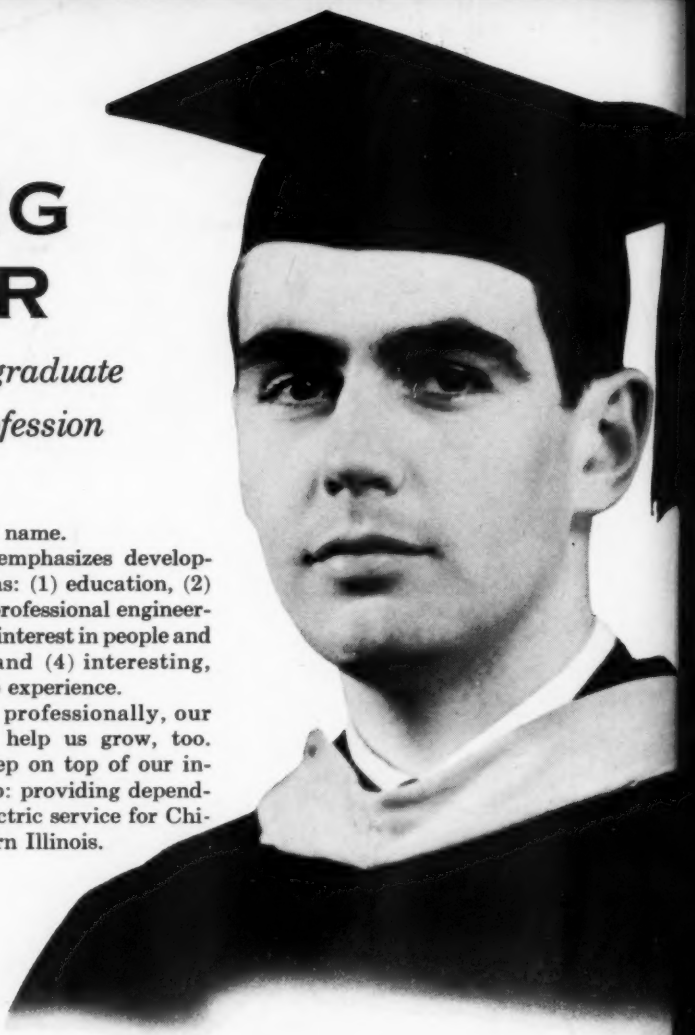

Commonwealth Edison's College Graduate Training Program helps the new graduate become an engineer in fact as well as in name.

The program emphasizes development in four areas: (1) education, (2) participation in professional engineering activities, (3) interest in people and their problems and (4) interesting, varied on-the-job experience.

As they grow professionally, our young engineers help us grow, too. They help us keep on top of our increasingly big job: providing dependable, low-cost electric service for Chicago and Northern Illinois.

Varied jobs in different departments give the beginning engineer a broad view, help him choose a specialty wisely.

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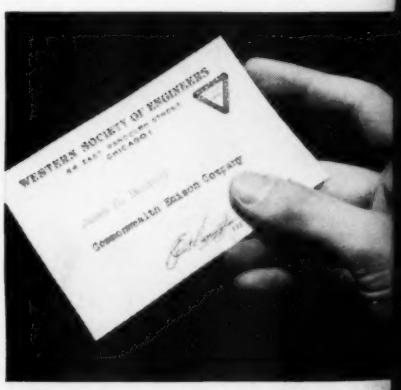

Introduction to professional societies enables young engineers to make valuable contacts, learn of new developments.

NOTE: *We've put together a folder describing opportunities for young engineers at Commonwealth Edison. If you've ever been asked for job-finding advice by a young engineer, this folder may prove helpful to you. For a free copy of "Employment Opportunities for Engineers," write or phone our Employment Office, 72 W. Adams St., Chicago.*

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